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No.

Supreme Court, U.S.
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In the

Supreme Court of the United States.

OCTOBER TERM, 1988.

GABRIEL ELECTRONICS, INC.,
PETITIONER,

v.

ANDREW CORPORATION,
RESPONDENT.

PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT.

CHARLES E. PFUND,*
ROBERT M. ASHER,
DIKE, BRONSTEIN, ROBERTS,
CUSHMAN & PFUND,
130 Water Street,
Boston, Massachusetts 02109.
(617) 523-3400
Counsel for Petitioner

**Counsel of Record*

BATEMAN & SLADE, INC. BOSTON, MASSACHUSETTS

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Questions Presented for Review.

I. Did the Federal Circuit Court correctly interpret 35 U.S.C. § 112, second paragraph, which requires patent claims to "particularly point out and distinctly claim" the invention, to reverse the district court's holding of invalidity for indefiniteness in a decision which explicitly authorizes claims with an undefined "gap between the claimed invention and the prior art" where such gap lies squarely within the "zone of uncertainty" the existence of which this Court has held makes a claim invalid? *United Carbon Co.* v. *Binney & Smith Co.*, 317 U.S. 228 (1942).

II. Shall the Federal Circuit Court be permitted to ignore this Court's direction to it in *Dennison Manufacturing Co.* v. *Panduit Corp.*, 475 U.S. 809 (1986) to apply the clearly erroneous standard of Rule 52(a) where the U.S. District Court's decision on indefiniteness was reversed without a single reference to the underlying factual findings?

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No.

In the
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OCTOBER TERM, 1988.

GABRIEL ELECTRONICS, INC.,
PETITIONER,

v.

ANDREW CORPORATION,
RESPONDENT.

PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT.

Petitioner, Gabriel Electronics, Inc., respectfully prays that a writ of certiorari be issued to review the decision of the United States Court of Appeals for the Federal Circuit entered in this case on May 25, 1988.

Opinions Below.

The opinion of the United States Court of Appeals for the Federal Circuit (App. A., *infra* at 1a-16a) has been reported at 847 F.2d 819, 6 U.S.P.Q.2d 2010. That opinion reverses in part an unreported decision of the United States District Court for the District of Maine (App. B. and C., *infra* at 17a-46a).[1]

Jurisdiction.

The judgment of the Court of Appeals for the Federal Circuit was entered on May 25, 1988, rehearing denied June 14, 1988 (App. D., *infra* at 47a). This Court's jurisdiction is invoked under 28 U.S.C. § 1254(1).

Constitutional Provisions, Statutes and Rules.

UNITED STATES CONSTITUTION.

Article I, Sec. 8, cl. 8:

"The Congress shall have Power . . . To promote the Progress of Science and Useful Arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

35 U.S.C. § 112, second paragraph:

"The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."

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[1] That opinion also affirms a decision of the United States District Court for the District of Maine reported at 2 U.S.P.Q.2d 1792 (1987) which is not involved in this petition.

35 U.S.C. § 33, R.S. § 4888:

"[the applicant for patent] shall particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery."

Rule 52(a), Federal Rules of Civil Procedure:

"(a) *Effect*. In all actions tried upon the facts without a jury . . . Findings of fact, whether based on oral or documentary evidence, shall not be set aside unless clearly erroneous, . . ."

Statement of the Case.

The district court made a careful analysis of the patent claims in U.S. Patent No. 4,410,892 ("the Knop patent") and found them to be invalid under 35 U.S.C. § 112, second paragraph, for indefiniteness.

The Knop patent is directed to a microwave horn reflector antenna of the type used on towers throughout the country for microwave long distance telephone routes.

A very brief description of the patented antenna will simplify understanding the underlying facts specific to the issues raised by this petition.

Inside the back cover of this petition is a diagram of the patented antenna (Fig. 22 of the Knop patent in suit). A sheet-metal enclosure consists of a horizontal cylinder 13 which is connected to a vertical cone 10. These parts intersect in a saddle-shaped curve S. A reflector 11 focuses microwave signals which pass through the cone into a horizontal beam that radiates out of the cylinder 13. The radiation pattern has a main beam on the horizontal axis 14 and sidelobes at angular positions off the axis 14.

Antennas of this type were first described in the *Bell System Technical Journal* in 1963 and have been commercially available from petitioner since 1968 and respondent since 1981.

The prior art antennas of this type had the inner surface of the cylinder and the upper portion of the cone lined with a microwave absorber material 22. The invention consisted of extending the absorber lining 35 further down into the cone.[2] (See App. B. at 45a for the district court's similar diagram of petitioner's antenna and App. B. at 19a footnotes 3 and 4, for the district court's description of the absorber of the prior art and the invention.) The prior art absorber 22 extended from the top of the saddle S into the cone 3 feet-9 inches. The absorber of the invention added 5 feet-5 inches as shown in the diagram.

The object of placing absorber in the cone in the prior art antennas was to reduce the sidelobe properties, i.e., the E and H plane radiation pattern envelopes (RPE's). The object of the claimed invention was to make these E and H RPE's equal.

The district court found that Gabriel had proved that incremental additions of absorber downward from the top of the cone produced corresponding improvement toward the desired equality result (App. B., 32a).

Throughout the trial and appeal below, Andrew emphasized that the ultimate result — equality — was achieved only when the cone absorber extended the full distance "deep in the throat" of the cone (App. A., 3a). Because no witness for either party could say where the invention started, i.e., how much absorber could be added to the prior art cone absorber without infringement, the district court found:

> Gabriel has shown by clear and convincing evidence that the claims of the Knop patent are not

[2] The different types of absorber are not significant (App. B., 29a).

> definite enough to fulfill the statutory purpose of allowing those skilled in the art to predict with any certainty what will constitute infringement. (App. B., 33a.)

Based on this and underlying findings, the district court held: "Those claims are, therefore, invalid." (App. B., 34a.)[3]

This holding and the quoted ultimate finding were based on numerous underlying factual findings as a result of the Court's analysis of the patent itself, the exhibits and the witnesses' testimony at trial (App. B., 31a). These factual findings of the district court were as follows:

1. Referring to the RPE's recited in each claim:

. . . "there is no way to know how much variation would be permissible without infringement." (App. B., 32a.)

2. Referring to the taper of the field distribution in claim 5:

"Again, the language is very vague as to the amount of absorber to be added, and DX-44B shows a progressive increase in the taper of the field distribution on the E-plane as progressive additions of absorber are made." (App. B., 35a.)

3. Referring to Andrew's expert testimony:

"Andrew witnesses were unable to say with specificity where the invention began or ended." (App B., 32a.)

"Mr. Brooker, Andrew's Director of Research testified that there is no particular boundary . . . the absorber should just be extended until the patterns are essentially equal." (App. B., 32a.)

"When asked whether the term approach, as used in the patent, was subjective, Andrew witness, Edward Ostertag replied: 'somebody has to make a final decision when things are not exactly identical, whether 10dB apart or 20dB apart, somebody has to decide.'" (App. B., 32a-33a.)

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[3]The text of typical claims appears at App. A., 4a-5a.

4. The Court concluded:

"Given the actual language and the lack of certainty even on the part of Andrew personnel, the Court is convinced that the language of the patent claims is not definite enough to meet the statutory requirement." (App. B., 33a.)

5. Regarding indefiniteness based on the testimony of Andrew witnesses the court said:

"This finding is reinforced by the testimony of Gabriel's Robert Whiting, who stated that the only way one could be certain of avoiding infringement of claim 1 would be to leave absorber out of the cone entirely Tr. at 438. Because of the progressive narrowing in the E-plane and increase in taper with the addition of absorber, his estimation must be correct." (App. B., 33a.)

6. The court thus found:

"The choice of a point beyond which there is infringement, therefore, is arbitrary and the point unforeseeable." (App. B., 33a.)

The Federal Circuit Court without reference to *any* findings of the district court reversed on the sole ground that in its opinion an antenna with *equality* of the claimed electrical properties would be known by those skilled in the art (App. A., 7a). It approved the presence of an undefined "gap" between the prior art and the claimed invention (App. A., 9a). The appellate court gave no heed to the size of the gap nor to the fact that the claim language, the patent specification and the trial evidence failed, as the district court found, to show how far beyond the prior art, i.e. into the gap, one can safely go without infringing the claims.

Reasons for Granting the Writ.

A Writ of Certiorari should issue for two principle reasons:

First, contrary to the decisions of this Court and the United States Constitution, this Federal Circuit decision expands the protection afforded to a patentee well beyond the scope of an inventor's discovery by expressly validating claims which use indefinite or nebulous language. As such it "discourages invention only a little less than unequivocal foreclosure of the field" (*United Carbon*, 317 U.S. at 236, decided under R.S. 4888) in direct conflict with the Constitutional incentive.

Second, this case represents a clear violation by the Federal Circuit Court of Rule 52(a) of the Federal Rules of Civil Procedure, this despite the express directive to the Federal Circuit from this Court found in *Dennison Manufacturing Co.* v. *Panduit Corp.*, 475 U.S. 809 (1986).

I. Words of Degree Found to Make Patent Claims Indefinite in Light of the Specification Should Compel An Invalidity Holding.

The Federal Circuit Court decision ignored its own precedent in *Seattle Box Co., Inc.* v. *Industrial Crating and Packing, Inc.*, 731 F.2d 818, 826 (Fed. Cir. 1984) and the precedent of this Court in the case of *United Carbon*, 317 U.S. at 234 by giving approval to the use of inherently indefinite words of degree in patent claims without any reference to the Knop patent specification. Rather than analyzing the overwhelming evidence of indefiniteness in this case as the district court had done, the Federal Circuit Court approved the claim language based on their unsupported opinion that those skilled in the art would know when the E and H properties were "substantially equal." (App. A., 7a.)

To make such a blanket approval of words of degree without reference to the context in which those words are used and without reference to the testimony or the patent specification to see if those words have been given a particular meaning, ignores the statutory purpose of Section 112. In the words of this Court,

> The statutory requirement of particularity and distinctness in claims is met only when they clearly distinguish what is claimed from what went before in the art and clearly circumscribe what is foreclosed from future enterprise. A zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims would discourage invention only a little less than unequivocal foreclosure of the field.

United Carbon Co. v. *Binney & Smith Co.*, 317 U.S. 228, 236 (1942). Without a clear picture of the scope of the language used in the patent claims, competitors are forced out of competing within that zone of uncertainty to avoid risking the significant costs of litigation along with the uncertainty of outcome.

By reversing the invalidity of the indefinite claims in the Knop patent, the Federal Circuit Court has afforded the patentee an unfair advantage over its competitors which goes beyond the scope of its contribution to the art. The evidence was undisputed and the district court found that some absorber had been extended into the cone in the prior art (App. B., 19a n.3). The district court further found "a progressive increase in the taper of the field distribution on the E-plane as progressive additions of absorber" are made from the top of the cone (App. B., 32a). No one, not the district court nor the Andrew

or Gabriel expert witnesses, could determine how much further the prior art absorber in the cone could be safely extended without infringement (App. B., 32a-33a), hence the "zone of uncertainty" which this Court found to be a fatal defect exists in the Knop patent claims.

The Federal Circuit Court decision threatens to let down the statutory guard against unreasonable advantages to patentees which is provided by the definiteness requirement of Section 112. As this Court recognized, the definiteness requirement of the statute has always sought to guard the public against unfair advantages.

> The statute seeks to guard against unreasonable advantages to the patentee and disadvantages to others arising from uncertainty as to their rights. The inventor must "inform the public during the life of the patent of the limits of the monopoly asserted, so that it may be known which features may be safely used or manufactured without a license and which may not."

United Carbon Co., 317 U.S. at 232, quoting *General Electric Co.* v. *Wabash Appliance Corp.*, 304 U.S. 364, 369 (1938). The Federal Circuit Court decision justifies the indefinite claim language by saying that there is no duty to set the claim boundary at the tecnhological edge of the invention and that a gap can exist between the claimed invention and the prior art (App. A., 9a). Here, however, the claim language set no boundary which defines the gap.

The unfair advantage *United Carbon* found for such claim language is now made manifest by Andrew's motion for an injunction. Now that the validity of the patent has been safely established (save for review by this Court) by proof of "equal-

ity" obtained with 5 feet-9 inch extension of absorber into the cone, Andrew now backs up to nearly the top of the cone for the purpose of infringement and injunction. Ignoring the fact that the appellate court's permissible "gap" falls within the "zone of uncertainty" proscribed by *United Carbon* and that Andrew's Director of Research testified he was in doubt if a 6-foot absorber extension was an infringement (App. B., 32a), Andrew now seeks to enjoin all antennas which have absorber extending more than *30 inches* into the cone from the "shelf". (This "shelf" level and 30 inch extension are noted on the diagram inside the back cover.)

Clearly, Section 112 and *United Carbon* are meaningless if the "nose of wax" can be twisted to this extent. *White* v. *Dunbar*, 119 U.S. 47, 51 (1886)

II. The Federal Circuit Court Decision Reversed the District Court's Decision on Indefiniteness Despite the Underlying Factual Findings Which Were Not Held to be Clearly Erroneous.

The Federal Circuit Court decision is devoid of any discussion of the findings of fact by the district court. The reversal makes no reference to the record to support any reasons at all for overturning these findings. It makes absolutely no reference to the patent specification in discussing the definiteness of the claims and absolutely no reference to the testimony of the witnesses.

Rule 52(a) Fed. R. Civ. P. provides:

> Findings of fact, whether based on oral or documentary evidence, shall not be set aside unless clearly erroneous, and due regard shall be given to the op-

portunity of the trial court to judge the credibility of the witnesses.

The district court judge was the one to listen to the witnesses who were skilled in the art in their discussion of the patent claims. The district court judge was the one who heard and sifted through the evidence which developed a relationship between the amount of absorber in a feed cone and the RPE's produced by the antenna. The district court judge is the one who reviewed the taper distributions and RPE's produced by a progression of absorber into the feed cone of horn reflector antennas. Based upon the testimony and evidence presented at trial, the district court judge found that the claims of the Knop patent were not definite enough to predict with any certainty what will constitute infringement or be safely outside the scope of the claims. Of utmost importance is the fact that the patent specification did not provide a standard for Andrew's experts who testified, nor Gabriel experts, nor, indeed the district court to know the extent to which absorber can be used in the antenna cone (as was done in the prior art) free of infringement.

Without making any assertions of error in the factual findings set forth by the district court, the Federal Circuit Court decision merely substituted its view for that of the district court judge. It essentially reversed the district court without comment on the factual findings.

The Federal Circuit Court has again ignored its role as an appeals court. As has been clearly set forth by this Court in *Dennison Manufacturing Co.* v. *Panduit Corp.*, 475 U.S. 809 (1986), subsidiary factual findings are subject to the clearly erroneous standard. The *Panduit Corp.* case related to the question of obviousness, but its ruling applies equally to an issue of indefiniteness which also relies on factual findings. This Court stated in its opinion

> This description of the obviousness inquiry makes it clear that whether or not the ultimate question of obviousness is a question of fact subject to Rule 52(a), the subsidiary determinations of the District Court, at the least, ought to be subject to the rule.

Panduit, 475 U.S. at 811.

With regard to the issue here, indefiniteness depends on underlying factual findings such as the level of skill in the art, whether terms have a specific meaning to persons in the art, and whether the terms used in the claims can be used to predict what will or will not constitute infringement. These subsidiary factual findings are subject to the clearly erroneous standard. They were all considered and found by the district court as support for its holding the claims indefinite. Unless there can be found a basis for rejecting as clearly erroneous the findings of the district court which support its holding of indefiniteness of the claims, the judgment of the district court of invalidity of the claims for indefiniteness should have been affirmed. *Pambello* v. *Hamilton Cosco, Inc.*, 377 F.2d 445, 447 (7th Cir. 1967).

Conclusion.

The decision below erroneously permits patents to include loose language in their claims which may then be used to unfairly assert against the public a scope of invention beyond the inventor's actual discovery. Rather than encouraging invention, such a decision threatens to encourage inartful patent claim drafting and discourage invention.

This petition should be granted to preserve the precedents set by this Court and to confine the Federal Circuit Court to its proper role as an appeals court.

A Writ of Certiorari should issue to review the judgment of the United States Court of Appeals for the Federal Circuit.

Respectfully submitted,

CHARLES E. PFUND,
ROBERT M. ASHER,
DIKE, BRONSTEIN, ROBERTS,
CUSHMAN & PFUND,
130 Water Street,
Boston, Massachusetts 02109.
(617) 523-3400
Counsel for Petitioner

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Appendix A.

United States Court of Appeals for the Federal Circuit

86-1689,-1690, 87-1193

ANDREW CORPORATION,
Plaintiff-Appellant,

v.

GABRIEL ELECTRONICS, INC.,
Defendant/Cross-Appellant.

Stephen G. Rudisill, Arnold, White & Durkee, of Chicago, Illinois, argued for plaintiff-appellant.

Charles Pfund, Dike, Bronstein, Roberts, Cushman & Pfund, of Boston, Massachusetts, argued for defendant/cross-appellant. With him on the brief was *Robert M. Asher*.

Appealed from: U.S. District Court for the District of Maine

Judge Carter

United States Court of Appeals for the Federal Circuit

86-1689,-1690, 87-1193

ANDREW CORPORATION,
Plaintiff-Appellant,

v.

GABRIEL ELECTRONICS, INC.,
Defendant/Cross-Appellant.

DECIDED: May 25, 1988

Before FRIEDMAN, NEWMAN, and ARCHER, *Circuit Judges*.

NEWMAN, *Circuit Judge*.

Andrew Corporation (Andrew) and Gabriel Electronics, Inc. (Gabriel) appeal and cross-appeal two final judgments of the United States District Court for the District of Maine. The court held[1] Andrew's U.S. Patent No. 4,410,892 (the Knop patent) invalid for indefiniteness, but if valid infringed by Gabriel. The court's second judgment[2] held Gabriel's U.S. Patent No. 3,550,142 (the Dawson patent) not infringed by Andrew. We reverse the judgment of invalidity of the Knop patent and affirm the other aspects of both judgments.

---

[1] *Andrew Corp. v. Gabriel Electronics, Inc.*, No. 83-0372-P (D. Me. August 1, 1986).

[2] *Andrew Corp. v. Gabriel Electronics, Inc.*, 2 USPQ2d 1792 (D. Me. 1987).

Background

Both the Knop and the Dawson patents relate to improvements in horn reflector microwave antennas used in long distance telephone and data communication networks. As described by the district court, a horn reflector antenna generally is constructed of an inverted vertical "feed" cone and a horizontal cylinder, which intersect at right angles. The microwave beam enters the feed cone vertically from the apex of the cone; an angled paraboloidal reflector catches the unfocused beam as it rises, focuses it into a coherent beam, and reflects it out the horizontal cylinder and on to the next antenna in the network.

The performance of such antennas is evaluated using the standard criteria of "gain" and "pattern". "Gain" refers to the strength of the focused beam relative to the original unfocused beam; higher gain allows transmission over longer distances. "Pattern", or "Radiation Pattern Envelope" ("RPE"), refers to the distribution of microwave energy outside the main beam in what are referred to as "sodelobes".

These patterns are measured in both the horizontal ("E-plane") and the vertical ("H-plane") directions. Normally, the E-plane has more energy distributed outside the main beam. This is referred to as having "higher sidelobes" or "a wider pattern", and results in unwanted interference with nearby antennas. The overall performance of an antenna is measurable by the E-plane and H-plane patterns.

THE KNOP PATENT

The Knop patent specification describes a horn reflector antenna that reduces interference with other antennas without significant loss of gain. This improved result is obtained by placing absorber material deep inside the conical feed horn. The use of absorber material had been shown in the prior art,

placed in the first few inches of the conical feed horn to dampen stray radiation. According to the prior art, placing absorber material deeper into the cone causes unsatisfactory loss of gain. Knop teaches that this deep absorber acts by reducing the width of the E-plane RPE without significantly affecting the quality of the H-plane RPE, thereby improving overall performance of the antenna.

Indefiniteness — 35 U.S.C. § 112

A

The district court held the Knop patent claims invalid, stating that terms in the claims such as "approach each other", "close to", "substantially equal", and "closely approximate", with reference to the E-plane and H-plane RPEs, were too vague to satisfy the requirement of definiteness stated in 35 U.S.C. § 112.[3] One or more of these terms appears in each of the claims, as illustrated in the following independent and dependent claims:

> 1. A conical horn-reflector antenna comprising the combination of: a paraboloidal reflector forming a paraboloidal reflecting surface for transmitting and receiving microwave energy,
>
> a smooth-walled conical feed horn for guiding microwave energy from the focus of said paraboloidal reflecting surface to said reflector, and
>
> a lining of absorber material on the inside wall of the horn for reducing the width of the RPE in the E plane of the antenna without significantly increasing the width of the RPE in the H plane, said absorber

[3] 35 U.S.C. § 112 ¶2: The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

> increasing the Eigen value E and the spherical hybridicity factor R_s sufficiently to cause the E plane and H plane RPEs *to approach each other*.
> 3. A conical horn-reflector antenna as set forth in claim 2 which produces *substantially equal* E and H plane illumination patterns.
> 6. A method as set forth in claim 5 wherein said lining of absorber material increases the taper of the field distribution along the radii of said horn in the E plane to *closely approximate* the taper of the field distribution along the radii of said horn in the H plane. [emphases added]

The criticized words are ubiquitous in patent claims. Such usages, when serving reasonably to describe the claimed subject matter to those of skill in the field of the invention, and to distinguish the claimed subject matter from the prior art, have been accepted in patent examination and upheld by the courts. As this court put it in *Rosemount, Inc. v. Beckman Instruments, Inc.*, 727 F.2d 1540, 1546-47, 221 USPQ 1, 7 (Fed. Cir. 1984):

> Beckman attacks the claims as indefinite, primarily because "close proximity" is not specifically or precisely defined. As stated in the district court's Memorandum Decision, "to accept Beckman's contention would turn the construction of a patent into a mere semantic quibble that serves no useful purpose."

In *Rosemount* the district court found that " 'close proximity' is as precise as the subject matter permits". *Id.* In *Seattle Box Co. v. Industrial Crating & Packing*, 731 F.2d 818, 826, 221 USPQ 568, 573-74 (Fed. Cir. 1984) (citing *W. L. Gore & Asso-*

ciates, Inc. v. Garlock, Inc., 721 F.2d 1540, 1557, 220 USPQ 303, 316 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984)), the court remarked that "substantially equal" is a term of degree, and that its acceptability depends on "whether one of ordinary skill in the art would understand what is claimed . . . in light of the specification", even if experimentation may be needed.

In *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, No. 87-1296, 842 F.2d 1275, 1280, 6 USPQ2d 1277, 1282 (Fed. Cir. 1988), this court stated that an "imprecise claim limitation, such as the phrase 'about 100% per second' " does not impart invalidity to the claims, but is to be considered in determination of infringement. *See also Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1385, 231 USPQ 81, 95 (Fed. Cir. 1986) ("the claims, read in light of the specification, reasonably apprise those skilled in the art and are as precise as the subject matter permits. As a matter of law, no court can demand more"), *cert. denied*, 107 S. Ct. 1606 (1987); *Shatterproof Glass Corp. v. Libbey-Owens Ford Co.*, 758 F.2d 613, 624, 225 USPQ 634, 641 (Fed. Cir.), *cert. dismissed*, 474 U.S. 976 (1985):

> "If the claims, read in the light of the specification, reasonably apprise those skilled in the art both of the utilization and scope of the invention, and if the language is as precise as the subject matter permits, the courts can demand no more."

(quoting *Georgia-Pacific Corp. v. United States Plywood Corp.*, 258 F.2d 124, 136, 118 USPQ 122, 132 (2d Cir.), *cert. denied*, 358 U.S. 884 (1958)).

The Manual of Patent Examining Procedure instructs examiners in a similar vein. *See* MPEP § 706.03(d):

> [An examiner] should allow claims which define the patentable novelty with a *reasonable* degree of particularity and distinctness. Some latitude in the manner of expression and the aptness of terms should be permitted even though the claim language is not as precise as the examiner might desire. [emphasis in original]

Andrew asserted that the Knop claims could not reasonably be expressed more precisely; and indeed the court found that it "became very clear during trial . . . that curves showing RPEs for horn antennas will never be identical". Words similar to those used in the Knop claims appear in prior art patents that were of record in the district court, dealing with similar technology. For example, claim 1 of the U.S. Patent No. 3,305,870 to Webb describes a "radiation pattern whose magnitudes in both the E and H planes are substantially equal".

Neither the record nor the law supports Gabriel's position that one of ordinary skill in the art would not know when the RPEs were "substantially equal" or "closely approximate". The district court's ruling is contrary to authority, and the holding of invalidity on this ground is reversed.

B

The district court observed that the RPE's change gradually with increased depth of absorber in the cone. The court held that the claims must specifically delineate the point at which infringement starts, and that if such point does not correspond to an unexpected change in properties, the claims are fatally flawed under 35 U.S.C. § 112. The court said:

> There is no unexpected change in the E-plane at any of the levels of absorber which gives a clue to what is intended by the patent claims. The choice of a point

> beyond which there is infringement, therefore, is arbitrary and the point unforeseeable. [footnote omitted]

The district court held that the outer limit of the claim scope must coincide precisely with the point at which the claimed invention comes into scientific being. The court referred to *Brown-Bridge Mills, Inc. v. Eastern Fine Paper, Inc.*, 700 F.2d 759, 763, 217 USPQ 651, 655 (1st Cir. 1983), which quoted with approval the holding originating in *Kwik-Set, Inc. v. Welch Grape Juice Co.*, 86 F.2d 945, 947, 32 USPQ 104, 106 (2d Cir. 1936) that "It is only where the selected [i.e., claimed] point corresponds with the physical phenomenon and the patentee has discovered the point at which that physical phenomenon occurs that the maintenance of a patent monopoly is admissible."

This erroneous theory would prevent a patentee from obtaining claims that do not coincide with, or claim less than, the exact point at which a change in the physical phenomenon occurs; it would require the patentee always to discover that point, no matter how prolonged or expensive the additional research; and would bar patent protection when the change is by nature gradual or incremental at its transition, whether or not it is unobvious in view of the prior art.

Patentability is not measured against the closest point on the road to invention. Much technological change that meets the criterion of unobviousness, when viewed in light of the prior art, has a fuzzy boundary at its point of origin. Technological differences from prior art usually become more pronounced with distance from the boundary, but the changes may become manifest gradually. Indeed, the location of the boundary may well change with the available precision of measurement.

It is the prior public knowledge — the "prior art" — by which patentability is tested. A patentee may set the metes and

bounds of that which is sought to be patented, and it is not material whether the phenomena just outside these claims limits are qualitatively different from that which is claimed. The patentee is not required to show that some technological discontinuity exists between the claim invention and the subject matter just outside the claims, but only that the claimed subject matter would have been nonobvious in view of the prior art. 35 U.S.C. § 103.

The law imposes no obligation on a patent applicant to determine what is going on in the technological gap between the claimed invention and the prior art, or to set the claim limits at the precise technological edge of the invention. A claim is not fatally indefinite for failing specifically to delineate the point at which the change in physical phenomenon occurs. See, for example, the extensive body of case law holding that a patentee may claim less than the entire invention:

> Nothing is better settled in the law of patents than that the patentee may claim the whole or only a part of his invention, and that if he only describe and claim a part, he is presumed to have abandoned the residue to the public.

McClain v. Ortmayer, 141 U.S. 419, 423-24 (1891).

To the extent that *Brown-Bridge* may be read as holding, as the district court appears to have believed, that a claim is invalid unless it sets as a limitation the exact technological border of the invention, we expressly reject that holding.[4] The district court's judgment of invalidity on this ground is reversed.

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[4] The case authorities relied on in *Brown-Bridge, viz. Kwik-Set* and *Helene Curtis Indus. v. Sales Affiliates*, 233 F.2d 148, 154, 109 USPQ 159, 163-64 (2d. Cir. 1956), do not support the application that the district court gave them. In both *Kwik-Set* and Helene Curtis the claim limitation fell in the midst

Obviousness and Enablement.

Gabriel appeals the district court's judgment that the Knop patent had not been proved invalid for obviousness, 35 U.S.C. § 103, or for lack of enablement, § 112. We have considered all of the arguments on both sides, and conclude that the court did not err in holding that the presumption of validity concerning these issues had not been overcome by clear and convincing evidence. *See Hybritech Inc.*, 802 F.2d at 1375, 231 USPQ at 87 ("the presumption of validity goes to validity of the patent in relation to the patent statute *as a whole*, not just to non-obviousness") (emphasis in original).

Inequitable Conduct.

Gabriel asserted that Knop withheld material references form the parent examiner, thereby rendering the patent unenforceable for inequitable conduct. The district court determined that a European patent application which was disclosed to the patent examiner in a Rule 312 amendment, 37 C.F.R. § 1.312, was reasonably timely disclosed and was not material to the prosecution of the Knop patent. The court also found that a horn antenna that was in the applicant's possession was "disclosed generally in the patent application" and that there was no intent to withhold this information. None of these findings has been shown to be clearly erroneous. Both materiality and intent to withhold must be shown, before these elements can be balanced in determining whether the applicant was guilty of inequitable

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of the prior art; for instance the claim in *Helene Curtis* was to an optimum range of a chemical property where the chemical was already known to have that property. *See also Dow Co. v. Halliburton Co.*, 324 U.S. 320 (1945), which held on similar facts that the claimed range must be proved critical in order to show "invention". These cases were all concerned with showing "invention" in light of prior art, rather than the § 112 issues here involved.

conduct in patent prosecution. *J.P. Stevens & Co. v. Lex-Tex Ltd.*, 747 F.2d. 1553, 1560, 223 USPQ 1089, 1092 (Fed. Cir. 1984), *cert. denied*, 474 U.S. 822 (1985).

We affirm the district court's conclusion that inequitable conduct has not been proved by clear and convincing evidence.

Infringement of the Knop Patent.

Andrew asserted infringement of Knop claims 1, 2, 3, 5, and 6 by the Gabriel antenna, either literally or in terms of the doctrine of equivalents. The district court first considered Andrew's assertion of literal infringement.

Construing the claims in light of the prosecution history, the court concluded that the final phrase of all the independent claims

> said absorber increasing the Eigen value E and the spherical hybridicity factor R_s sufficiently to cause the E plane and H plane RPEs to approach each other

was a material limitation because it was added during prosecution. The court heard testimony on whether the absorber in the accused Gabriel antenna achieved this result. Two experts testified, one called by Gabriel and one by Andrew, taking contrary positions on this issue. The district court found both experts to be "competent" and "credible". The court stated that it could not decide between the opposing positions of the experts concerning the Eigen value and the spherical hybridicity, and that "the court has no basis for accepting either proposition over the other". The court thus concluded that the evidence was "in equipoise", and therefore that the plaintiff had not met its burden of proving infringement by preponderant evidence.

A true equipoise of evidence may indeed defeat the party with the burden of proof, *see Aero Spacelines, Inc. v. United States*, 530 F.2d 324, 332 (Ct. Cl. 1976); *see also Wilson v. Omaha Indian Tribe*, 442 U.S. 653, 669 (1979), but there is no authority for holding evidence to be in equipoise for the sole reason that the court could not decide between conflicting experts. We agree with the statement in *United States v. General Motors Corp.*, 561 F.2d 923, 933 (D.C. Cir. 1977), *cert. denied*, 434 U.S. 1033 (1978):

> The mere fact that experts disagree does not mean that the party with the burden of proof loses. The finder of fact has to make the effort to decide which side has the stronger case. This can be based on the demeanor of the witnesses (if so, the trial judge should say so) or the intellectual strength of the evidence and arguments based thereon.

Given the complexity of modern technology, it may well happen that qualified experts will appear on both sides, that their testimony will conflict, and that the testimony or the technology or both of them will be difficult to understand. However, to decline to decide the issue when conflicting evidence appears to be counterbalancing solely because the subject matter is technically complex, will defeat the party with the burden of proof without fair hearing.

Such treatment would remove complex technological issues from the purview of justice; this can not reflect the correct judicial response to a world increasingly bound to technology. Thus we do not endorse in principle the district court's treatment of literal infringement. In this case, however, the issue of infringement was adequately resolved by the court's analysis in terms of the doctrine of equivalents.

The district court found that Gabriel's antenna infringed the Knop patent under the doctrine of equivalents, applying the

classical analysis of *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 85 USPQ 328 (1950). The court stated, "From exhibits produced at trial, and without necessarily understanding the mathematical explanation, the Court can see that both the [accused device and] Andrew's embodiment of the patent function in the same way." The court thus found that although it did not know the precise changes in the Eigen value and spherical hybridicity factors of the final clause of claim 1, equivalency had been established based on the similarities in structure and RPEs of the accused antenna and the patented antenna, which showed that the two antennas achieved the same results by the same means in the same way. Thus, although the court had found that the evidence as to the subject matter of the final phrase of the claim was inconclusive, the court stated:

> At trial, the Court was thoroughly persuaded that for all practical purposes the [accused device] produced virtually the same patterns as those produced by the [patented device].

The court concluded that

> by use of the same means, the [accused device] produces the same results in the same way as the invention described by the Knop patent.

The court, applying the doctrine of equivalents to the accused device in light of the claimed invention viewed as a whole, held that the accused device was within the ambit of the claim, despite the absence of preponderant evidence as to the final phrase when analyzed in isolation from the rest of the claim.

Gabriel argues that the doctrine of prosecution history estoppel requires that the limitation of the final claim phrase be

affirmatively found in the accused device, and that it can not be inferred based on similarities in structure, way, and result. Gabriel argues that since the district court held itself incapable of finding this fact, infringement can not be found, even under the doctrine of equivalents.

The district court had held, responding to this argument by referring to the prosecution history, that "it seems more appropriate to characterize the [addition during examination of the final claim phrase] as a clarification of the function of the absorber in the cone". The court concluded that "where the amendments were made for the purposes of explication and clarity, the Court does not think it appropriate to invoke estoppel against the application of the doctrine of equivalents."

The purpose of an amendment must be taken into account when considering prosecution history estoppel. *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1363, 219 USPQ 473, 481 (Fed. Cir. 1983) ("Depending on the nature and purpose of an amendment, it may have a limiting effect within a spectrum ranging from great to small to zero"). *See also Moeller v. Ionetics, Inc.*, 794 F.2d 653, 659-60, 229 USPQ 992, 996-97 (Fed. Cir. 1986) (amendment was not intended to limit, but "to 'particularly point out' the invention", quoting the examiner).

We agree with the district court's determination that this amendment to the Knop claims did not bar application of the doctrine of equivalents. Relying on the totality of similarities between the accused device and the claimed structure, including the similarities in the RPEs that are referred to in the final phrase of the claims, the district court found that the accused antennas perform the same function in substantially the same way to achieve substantially the same result as the claimed device. No clear error having been shown, the district court's finding of infringement is affirmed.

The Dawson Patent.

The court held that Gabriel's Dawson patent for a horn reflector microwave antenna was not literally infringed by the Andrew antenna since the claimed isolation of the reflector assembly was not literally present. *Andrew Corp. v. Gabriel Electronics, Inc.*, 2 USPQ2d 1792, 1793-94 (D. Me. 1987). The court also held that the patent was not infringed under the doctrine of equivalents.

It was not contested that the "isolation of the reflector assembly" is a critical limitation in the Dawson patent claims. The accused Andrew device was tested to determine if isolation existed. The court reviewed these tests and the accompanying testimony, and held that neither isolation nor an equivalent was present. We discern no clear error in the court's analysis and reasoning and affirm its decision of noninfringement of the Dawson patent.

Summary.

The court's judgment of invalidity of the Knop patent due to claim indefiniteness is reversed. The holding of validity on all other grounds is affirmed.

The judgment that the Gabriel antenna infringes the Knop patent is affirmed; the matter is remanded for determination of damages.

The judgment of non-infringement of the Dawson patent is affirmed.

Costs.

Costs in appeal and cross-appeal in favor of Andrew Corporation, the prevailing party.

Affirmed in part, reversed in part, and remanded.

United States Court of Appeals for the Federal Circuit

86-1689,-1690, 87-1193

ANDREW CORPORATION,
Plaintiff-Appellant,

v.

GABRIEL ELECTRONICS, INC.,
Defendant/Cross-Appellant.

ARCHER, *Circuit Judge*, concurring.

I join the majority opinion, except for the section headed "Infringement of the Knop Patent." With regard to infringement of the Knop patent, there is no need to consider literal infringement because, as the majority determines, the district court did not clearly err in finding tht the Gabriel antenna infringes the Knop patent under the doctrine of equivalents.

I would, nonetheless, add that the district court's determination that Andrew had failed to carry its burden of proving literal infringement by preponderant evidence was not improper in my view, albeit probably unnecessary in view of its finding of infringment [*sic*] under the doctrine of equivalents. I also consider unwarranted the majority's criticism of the district court for finding the evidence on literal infringement to be "equipoise" where, according to the district court, the critical "evidence of the opposing experts was directly contradictory" and presented "no basis for accepting either proposition over the other."

Appendix B.

United States District Court
District of Maine

ANDREW CORPORATION,
Plaintiff

v.

Civil No. 83-0372-P

GABRIEL ELECTRONICS,
Defendant

CARTER, District Judge

OPINION AND ORDER

I. *Background.*

In this action Plaintiff, Andrew Corporation, seeks damages and injunctive relief for the alleged infringement of its Knop patent, U.S. Patent No. 4,410,892, for a horn reflector microwave antenna by Defendant's TH-10 horn reflector antenna. Defendant Gabriel Electronics asserts that it has not infringed the Knop patent. It further asserts that the patent is invalid

and that it is unenforceable because of alleged inequitable conduct of Andrew in the prosecution of the patent before the Patent Office. Trial was held on the liability issues,[1] without a jury, beginning on May 7, 1986.

Horn reflector microwave antennas are used extensively in long distance telephone and data communication networks. This type of antenna has been manufactured by various companies, including Defendant Gabriel Electronics since the 1960's. Plaintiff Andrew Corporation did not enter the horn reflector market until 1980. As currently manufactured by the parties, the horn reflector antenna consists of an aluminum vertical cone and a horizontal cylinder which are aligned to intersect at right angles. A paraboloidal reflector is supported inside the cylinder to focus into a horizontal beam the microwave energy which is fed into the apex of the cone, which beam then passes out through the cylinder. Completing the antenna are a cap above the reflector and a microwave transparent radome covering the cylinder aperture.[2]

The performance of horn reflector antennas is evaluated by the use of two criteria, gain and pattern. The term "gain" refers to the strength of the focused beam relative to the original unfocused source of radiation. Greater gain in an antenna enables it to transmit energy over longer distances, thus necessitating fewer antennas over a given communication route. The second performance criterion, pattern, refers to the distribution of microwave energy outside the main beam in what are called sidelobes. Patterns are measured in two planes, the

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[1] In a previous order, the Court had bifurcated the liability and damages phases of the trial. Also, at the conclusion of the trial because of scheduling conflicts of the Court, Defendant's counterclaim for infringement of its Dawson patent was severed for trial in the fall.

[2] Appendix 1 incorporates PX-21, a diagram of Gabriel's TH-10, and generally illustrates a horn reflector antenna of the type at issue.

E (horizontal) plane and the H (vertical) plane. The E-plane pattern generally has higher sidelobes and is much wider than the H-plane, indicating more energy distributed outside the main beam. High sidelobes are undesirable because they produce the possibility of interference with nearby antennas, a problem that has become more serious as telecommunication routes have become more congested.

The Knop patent in suit claims a horn relector antenna with absorber placed in the conical feed horn for the purpose of reducing the width of the radiation pattern envelope (RPE) in the E-plane without significantly increasing the width of the H-plane. For many years prior to the issuance of the patent, Gabriel and Antennas for Communication (AFC), another antenna manufacturer, had manufactured horn reflector antennas with absorber lining the cylinder, the saddle (the area where the conical portion intersects the cylinder), and a few inches of the conical feed horn.[3] Andrew began selling a similar antenna, the SHX-10, in 1980. The patent calls for extension of the absorber further into the conical horn.[4]

Further findings of fact will be made as they become pertinent to the legal discussion, *infra*.

II. *Infringement*

A. *Literal Infringement*

In this action Andrew has asserted infringement by Gabriel's TH-10 of claims 1, 2, 3, 5, and 6 of the patent assigned to it

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[3] The absorber in these antennas, the Gabriel UHR-10 and the AFC CH-10, is generally illustrated in Appendix 1 by the darker of the two shaded areas.

[4] The absorber placement as shown in the patent is generally like that found in both shaded areas of Appendix 1, with the lighter shading generally representing what is regarded by Andrew as the invention.

by Dr. Knop and the other inventors. In *Envirotech Corp. v. Al George, Inc.*, 730 F.2d 753 (Fed. Cir. 1984), the Court of Appeals for the Federal Circuit described the procedure by which infringement is to be determined:

> In general a finding of infringement depends on whether the accused device falls within the scope of the asserted claims as properly interpreted . . . . The patented invention as indicated by the language of the claims must first be defined (a question of law), and then the trier must judge whether the claims cover the accused device (a question of fact). . . . The patent owner must show by a preponderance of the evidence that the accused has infringed his patent. . . .

Id. at 758 (citations omitted).

Claim 1 of the patent provides for

> A conical horn-reflector antenna comprising the combination of:
>
> a paraboloidal reflector forming a paraboloidal reflecting surface for transmitting and receiving microwave energy,
>
> a smooth walled conical feed horn for guiding microwave energy from the focus of said paraboloidal reflecting surface to said reflector, and
>
> a lining of absorber material on the inside wall of the horn for reducing the width of the RPE in the H-plane, said absorber increasing the Eigen value E and the sperical [sic] hybridicity factor R_s sufficiently to cause the E-plane and H-plane RPEs to approach each other.

The evidence makes clear, and it is undisputed, that Gabriel's TH-10 antenna is a combination of a paraboloidal reflector and a smooth-walled conical feed horn lined with absorber on the inside wall. The testimony of Gabriel's own witnesses also makes clear that the purpose of the absorber lining is to improve the pattern of the antenna by reducing the width of the RPE in the E-plane without significantly increasing the width of the H-plane. The major area of dispute on the issue of literal infringement pertains to the final phrase which discusses the Eigen value and the spherical hybridicity factor. The Court finds that this is a material element of the patent claim because it was added to describe more fully the functioning of the invention after it had been twice rejected by the Patent and Trademark Office (PTO) as obvious. DX-1; *Loctite Corp. v. Ultraseal LTD*, 781 F.2d 861 (Fed. Cir. 1985).

The spherical hybridicity factor (R_s), as it is referred to in the patent, is a mathematical formulation of the mode structure of waves in a conical part of an antenna. It is a complex number describing hybrid modes and denoting the amount of the H field along the axis in the spherical coordinate system relative to the amount of the E field. Tr. 136. The Eigen value (E) is a number representing the proper value for X, consistent with the boundary conditions imposed, for solving the Bessel function J(0) of X = Z(0). Love Tr. at 348. As can be gleaned from their descriptions, both terms refer to highly complicated concepts.

The Court finds that Andrew has not met its burden of proving literal infringement of claim 1 for two reasons. First, although Dr. Love and other Andrew witnesses testified that the Eigen value and spherical hybridicity have increased with the addition of absorber in the Gabriel TH-10, Gabriel witnesses testified that the method used by Dr. Love to demonstrate this effect was flawed. Specifically, Plaintiff's expert, Dr. Love,

computed curves to quantify the values of E and R_s for Gabriel's antennas with and without absorber. To derive the curves, Dr. Love used equations 4 and 5 in the Andrew patent with a common curve fitting technique. Although E and R_s are complex numbers, with both real and imaginary components, Dr. Love plotted the curves as if E and R_s were real numbers; *i.e.*, he set 0 as the value of the imaginary part. Relying on PX63, a computer generated rather than measured analysis of the Eigen value equation, he testified that ignoring the imaginary component was justifiable because the imaginary part was less than one percent of the real part and therefore would have an indiscernible effect. Tr. at 409-11. The curves thus derived showed an increase in E and R_s when absorber was added in the cone section of the TH-10.

Professor Hamid, Defendant's expert, testified that it was mathematically indefensible to substitute 0 for the missing imaginary components. His calculations showed that rather than being negligible, the imaginary component in the equations, jR_sI, as .3 and should not have been ignored. Professor Hamid's analysis, therefore, challenges the results reached by the method employed by Dr. Love.

The Court finds the evidence on this point to be in equipoise. As can be gleaned from the brief foregoing discussion, determination of whether the Eigen value and spherical hybridicity factor increased in the TH-10 due to the addition of absorber in the cone requires complex mathematical calculations. Because of the level of sophistication of the mathematics involved, the Court must rely on the assistance of experts. Dr. Love and Professor Hamid both impressed the Court as highly intelligent, well-trained, and very competent experts in their field. The Court had no reason to question the credibility of either. The evidence they presented was directly contradictory,

however. Since, in the Court's view, the evidence is in equipoise, Andrew has failed to prove infringement by a preponderance of the evidence.

There is a second, more fundamental failure of proof regarding the alleged increase in spherical hybridicity and Eigen value in the Gabriel TH-10 antenna. The parties are in agreement that the spherical hybridicity factor pertains to hybrid modes. Dr. Love averred that hybrid modes exist in an absorber-lined horn reflector antenna like the Gabriel TH-10 or the one described in the Knop patent, and he supported his testimony on rebuttal with mathematical proof. Professor Hamid vehemently objected to the idea that hybrid modes are propagated in the Gabriel TH-10 and he demonstrated his position with mathematical proofs that Dr. Love described as heresy. Again, the Court has no basis for accepting either proposition over the other. Andrew, therefore, has failed to prove even that hybrid modes exist in the TH-10. Without these, the spherical hybridicity factor cannot exist and cannot be demonstrated to have increased.

Having determined that the clause discussing the E and R_s is a material part of claim 1 and that Plaintiff has failed to prove that these properties exist in the patented invention, the Court finds that Plaintiff has not only failed to establish infringement of the independent claim 1, but has also failed to establish infringement of the claims 2 and 3, which depend from claim 1. *Teledyne McCormick Selph v. United States*, 558 F.2d 1000, 1008 (Ct. Cl. 1977). Claim 5 was amended to include the exact phrase which Plaintiff failed to prove in claim 1. Thus, Plaintiff cannot prove infringement of claim 5 or claim 6 which depends from it.

B. *Infringement by Doctrine of Equivalents*

Even though Andrew has not shown literal infringement of the patent claims, it also asserts infringement under the doctrine

of equivalents. Under this doctrine, the Gabriel TH-10 infringes the Knop patent if it performs substantially the same function in substantially the same way to give substantially the same result. *Atlas Power Co. v. E.I. Du Pont De Nemours & Co.*, 750 F.2d 1569, 1579 (Fed. Cir. 1984). Plaintiff's Exhibit 21 shows that the Gabriel TH-10 has absorber in the conical feed horn like the absorber 35 shown in the Knop patent as avowedly embodied in the Andrew SHX-10A antenna. At trial, the Court was thoroughly persuaded that for all practical purposes the TH-10 produced virtually the same patterns as those produced by the SHX-10A. Plaintiff's Exhibits 26, 27, 28 and 29 demonstrate convincingly that when the absorber is added to the cone, the TH-10 produces E- and H-plane patterns that are very similar in configuration and that it does so by tapering the E-plane field distribution inside the antenna. Thus, by use of the same means, the TH-10 produces the same results in the same way as the invention described by the Knop patent.

Defendant argues that the illumination pattern (or taper) of E- and H-planes are not substantially equal because the measurements vary at some points by as much as four to one. The Court, however, accepts the testimony of Dr. Love on this point to the effect that the energy may vary this much because of the existence of higher order modes without much power that are essentially unimportant to terms of significant taper.[5]

Gabriel also argues that Plaintiff is estopped by the prosecution history of the patent to take advantage of the doctrine of equivalents. The doctrine of prosecution history, or file wrapper estoppel, as described by the Federal Circuit,

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[5] By adopting the testimony of Dr. Love on why such variations can be considered substantially equal, the Court does not accept his characterization of the modes there found as the hybrid mode HE11 and the higher order hybrid modes HE12 and EH12.

> precludes a patent owner from obtaining a claim construction that would resurrect subject matter surrendered during prosecution application. The estoppel applies to claim amendments to overcome rejections based on prior art . . . and to arguments submitted to obtain the patent. . . .

Hughes Aircraft Co. v. United States, 717 F.2d 1351, 1362 (Fed. Cir. 1983). The Court, however, eschewed a wooden application of estoppel which would render nugatory the doctrine of equivalents. Thus, it rejected the idea that virtually any amendment of the claims creates a file wrapper estoppel:

> Amendment of claims is a common practice in prosecution of patent applications. No reason or warrant exists for limiting application of the doctrine of equivalents to those comparatively few claims allowed exactly as originally filed and never amended. Amendments may be of different types and may serve different functions. Depending on the nature and purpose of an amendment, it may have a limiting effect within a spectrum ranging from great to small to zero. The effect may or may not be fatal to application of a range of equivalents broad enough to encompass a particular accused product. It is not fatal to application of the doctrine itself.

Id. at 1363. Thus, the mere fact that the Knop patent claims were amended before acceptance to include the description of the effects of the additional absorber on the Eigen value and spherical hybridicity in the horn reflector antenna does not preclude a finding of infringement under the doctrine of equivalents.

In examining the particular amendment, the Court notes that the patent had twice been rejected as obvious on the basis of prior art. The examiner allowed the patent only after claims one and five were amended with the language "said absorber increasing the Eigen value E and the spherical hybridicity factor R_s sufficiently to cause the E-plane and H-plane RPEs to approach each other." Gabriel urges the Court to find that the amendments limited the claims. On the record before the Court, however, it seems more appropriate to characterize the amendments as a clarification of the function of the absorber in the cone.[6] Andrew's attorney's remarks explaining the amendment to the examiner make this clear: "Amendments to claims 1 and 8 are presented to more strongly emphazise the function of the absorber material on the inside wall of the horn and in this way more clearly distinguish the claimed subject matter from the cited patents." DX-1. When asked why it was necessary to amend the claims, one of the patent inventors testified: "I don't know all the details but my understanding is that the patent examiner was having trouble understanding

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[6] The Court does not find it inconsistent to have found the amendments to be material elements of claims one and five for purposes of proving literal infringement yet not limitations for purposes of the doctrines of equivalents and file wrapper estoppel. The patent claims describe a microwave horn antenna with increased Eigen value and spherical hybridicity; in other words, an antenna containing hybrid modes. As explained above, the Court cannot determine from the evidence whether these properties are present in the TH-10. The Court is satisfied, however, that increased Eigen value and spherical hybridicity are terms supposedly describing the taper effect seen in the curves generated in both antennas as a result of the addition of absorber in the cone. Although it was not presented convincingly enough to the Court at trial, this mathematical description apparently aided the patent examiner in understanding the function of the invention so he approved it. From exhibits produced at trial, and without necessarily understanding the mathematical explanation, the Court can see that both the TH-10 and SHX-10A (Andrew's embodiment of the patent) function in the same way.

the effect." Tr. 1 at 223. There is no indication that the amendments made any material change in the scope of the claims. *See American Photocopy Equipment Co. v. Rovico, Inc.*, 384 F.2d 813 (7th Cir. 1967). Rather, the amendment merely explained in mathematically descriptive terms the increased taper of the curves generated by the antenna. Tr. 1 at 185-86. In this situation, where the amendments were made for the purposes of explication and clarity, the Court does not think it appropriate to invoke estoppel against the application of the doctrine of equivalents. *See Central Soya Co. v. George A. Hormel & Co.*, 645 F.2d 847, 851 (10th Cir. 1981); Deller's Walker on Patents § 234.

III. *Validity*

A. *Enablement*

Section 112 of Title 35, United States Code provides that the patent specification shall include a written description of the invention in such precise terms as to enable any person skilled in the art to make and use it. Gabriel asserts that the Knop patent is invalid for failure to enable the claimed invention by reciting the allegedly nonexistent quantities of Eigen value and spherical hybridicity.

In *Raytheon Co. v. Roper Corp.*, 724 F.2d 951 (Fed. Cir. 1983), the Federal Circuit reiterated the principle that a claim including incorrect ideas is invalid because a claim containing a limitation impossible to meet cannot be enabled. *Id.* at 956. The *Raytheon* court cited *Linde Air Products Co. v. Graver Tank & Manufacturing Co.*, 86 F. Supp. 191, 197, *aff'd, Graver Mfg. Co. v. Linde Co.*, 336 U.S. 271, 277-79 (1949), in which the Court had denied the validity of a patent for a welding method in which the process claims asserted that no

electric arc phenomenon was present. On a record of conflicting evidence[7] the trial court concluded that there was an arc present:

> To make a claim for a . . . process in which these erroneous ideas are incorporated is to stake out a process . . . which does not in point of fact exist within the invention. While a patent covering a meritorious invention should not be struck down because the patentee has misconceived the scientific principle of his invention, the error cannot be overlooked when the misconception is embodied in the claim.

Linde Air Products Co., Inc. v. Graver Tank & Mfg. Co., 86 F. Supp. at 197.

The Knop patent claims asserts unequivocally that E and R_s are present in the microwave horn antenna with an absorber lining the cone. Andrew has failed to prove that point at trial. In the Court's view, however, as stated above, it is as likely as not that the antennas contain hybrid modes and, therefore, E and R_s. Although a serious question has been raised by Gabriel's evidence as to the correctness of the ideas expressed in the patent claim, a patent is presumed valid. *Brown-Bridge Mills v. Eastern Fine Paper, Inc.*, 700 F.2d 759, 761 (1st Cir. 1983). The burden of proving invalidity, therefore, is on the party asserting it. *Id.* Because the evidence is in equipoise, Gabriel has not met its burden.

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[7] The Supreme Court in *Graver* described a situation very reminiscent of the evidentiary posture of this case. "Just what happens in the Jones method admits of controversy . . . . Technicians may and probably will continue to debate with plausible arguments on each side as to what the obscure process really is." *Graver Mfg. Co. v. Linde Co.*, 336 U.S. at 279.

Gabriel also argues that the patent is not enabling because the results presented at trial were obtained with 1″ absorber rather than the 3/8″ absorber suggested in the patent and that the claimed results cannot be obtained with 3/8″ absorber. The Court does not find this a significant objection to enablement. The patent states specifically that the 3/8″ absorber is only one example of the type of absorber necessary for the invention, PX-1, Col. 3 and it particularly disclaims limitation of the invention to any one embodiment. The patent specifically describes the absorber to be used in terms of its function: it "must have a thickness and loss tangent sufficient to suppress undesirable surface (slow) waves. . . . The end result is that all the improvements described above are attained without producing any undesirable distortion in the field pattern." PX-1, Col. 5. The Court finds that the patent is enabling in the sense that the absorber is described sufficiently to allow a person skilled in the art to make and use the invention.[8] The law is clear that an enabling disclosure may require a certain amount of experimentation; the amount of experimentation must not be unduly extensive, however. *Atlas Powder Co. v. E.I. Du Pont De Nemours*, 750 F.2d at 1576. In this case, the amount of experimentation necessary to determine the type of absorber required to achieve the results projected in the patent for addition of absorber in the cone of the antenna would not be burdensome. Thus, the Court cannot find that the specifications concerning absorber were insufficient under section 112.[9]

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[8] The Court finds that a person of ordinary skill in the art would be a microwave antenna engineer with several years experience at a horn reflector antenna manufacturer.

[9] Gabriel makes other enabling arguments which overlap with its arguments regarding definiteness. The Court will not, therefore, address them here.

B. *Definiteness*

Section 112 also requires that the invention be set forth with specificity and precision. The specification must conclude with claims "particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." 35 U.S.C. § 112. Both independent claims, one and five, include the limitation that the absorber lining the conical feed horn must "increas[e] the Eigen value *sufficiently to cause* the E-plane and H-plane RPEs *to approach* each other." PX-1, Col. 6. (Emphasis added.) Subsequent dependent claims state that the absorber reduces the width of the RPE in the E-plane *close to* the width of the RPE of the H-plane, PX-1, Col. 6 (Claim 2), that the reflector produces *substantially equal* E- and H-plane illumination patterns, *id.* (Claim 3), and that the method of adding absorber increases the taper of the field in the E-plane to *closely approximate* the taper in the H-plane. *Id.*, Col. 8 (Claim 6). (Emphasis added.)

Gabriel argues that the language used in the claims is too vague to demonstrate the actual invention. The Supreme Court has made clear that the primary purpose of claim language is to give fair notice of what will constitute infringement. *See United Carbon Co. v. Binney & Smith Co.*, 317 U.S. 228, 232, 236 (1942). Enterprise and experimentation should not be discouraged by claim language that creates an area of uncertainty as to the scope of the invention. *Congoleum Industries, Inc. v. Armstrong Cork Co.*, 339 F. Supp. 1036, 1055 (D. Pa. 1972), *aff'd.* 510 F.2d 334, *cert. denied*, 421 U.S. 988. Some inventions are, of course, not capable of description in terms of meticulous accuracy. *S.D. Warren Co. v. Nashua Gummed and Coated Paper Co.*, 205 F.2d 602, 605 (1st Cir. 1953). Claims containing terms such as those challenged by Defendant are not always held invalid for indefiniteness. *See,*

e.g., Colourpicture Publishers, Inc. v. Mike Roberts Color Productions, Inc., 394 F.2d 431 (1st Cir. 1968). *Lang v. Prescon Corp.*, 545 F. Supp. 933 (D. De!. 1982); In determining whether claims are definite enough to meet the statutory requirement, the Court must apply the flexible standard of "reasonableness under the circumstances." *Antonious v. Pro-Group, Inc.*, 699 F.2d 337, 340 (6th Cir. 1983).

Andrew argues that its claim language is not indefinite because by reference to the description and figures of the patent the relative terms employed become clear. Andrew points specifically to language in the patent stating that the reduction of the E-plane should be measured at the 65 dB down level; that substantially equal is demonstrated by Figures 4 and 5, PX-1, Col. 3; and that the ideal is the coincidence of the E- and H-planes but that ideal can only be approximated. Col. 4. Having read and reread the language cited by Andrew, the Court cannot agree that it would make the patent claims sufficiently definite so that a person skilled in the art would know when he was infringing the patent.

By saying that the ideal is coincidence of the two planes but that the ideal can only be approximated, the description says no more than the claims did, for there is no indication of what is acceptable within the infinite range of approximations. Gabriel offered proof that the incremental addition of absorber adjacent to the wide end of the cone of a horn antenna causes incremental narrowing of the E-plane while the H-plane stays generally the same. Interpreting DX-39, which shows curves representing the RPEs with absorber to various levels of the cone, Gabriel witness Whiting stated:

> The general trend of the E-plane for each successive absorber level is for the pattern to narrow as you continue the absorber down the cone and the

> general trend for the H-plane is for after placing an absorber in the cylinder and slightly in the cone, there is no great amount of improvement or degradation.

Tr. 533; *see also* Tr. 536.

To the extent that there is a continuum or progression of improvement of the E-plane and increase in the taper occasioned by changes in the amount of absorber lining, as shown convincingly by DX-39 and DX-44, the Court does not find it helpful that the patent description says that the E-plane, as measured at the 65 dB down level, should be close to the H-plane and that substantial equality is illustrated in Figures 4 and 5. What became very clear during trial is that curves showing RPEs for horn antennas will never be identical. Since the curves in Figures 4 and 5 could not be meant to be matched exactly, there is no way to know how much variation would be permissible without infringement.

Claim five also asserts that the method it claims comprises "lining *at least a portion* of the inside wall of said feed horn adjacent to the wide end thereof with an absorber material which increases the taper of the field distribution." (Emphasis added.) Again, the language is very vague as to the amount of absorber to be added, and DX-44B shows a progressive increase in the taper of the field distribution on the E-plane as progressive additions of absorber are made. Tr. 546-50.

Andrew witnesses were unable to say with specificity where the invention began or ended. Mr. Brooker stated that a cone with 8 feet of absorber was certainly within the patent and that one with five or six feet might be. Tr. at 76-77. He testified that there was no particular boundary — the absorber should just be extended until the patterns are "essentially equal." Tr 76-77. When asked whether the term "approach," as used in

the patent, was subjective, Andrew witness Edward Ostertag replied: "Somebody has to make a final decision when things are not exactly identical, whether 10 dB apart or 20 dB apart, somebody has to decide." Tr. 252. Given the actual language and the lack of certainty even on the part of Andrew personnel, the Court is convinced that the language of the patent claims is not definite enough to meet the statutory requirement.

This finding is reinforced by the testimony of Gabriel's Robert Whiting, who stated that the only way one could be certain of avoiding infringement of claim 1 would be to leave absorber out of the cone entirely. Tr. at 438. Because of the progressive narrowing in the E-plane and increase in taper with the addition of absorber, his estimation must be correct. There is no unexpected change in the E-plane at any of the levels of absorber which gives a clue to what is intended by the patent claims. Tr. at 540. The choice of a point beyond which there is infringement, therefore, is arbitrary [10] and the point unforeseeable.

Gabriel has shown by clear and convincing evidence that the claims of the Knop patent are not definite enough to fulfill the

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[10] In discussing the criticality requirement under section 112, the Court of Appeals for the First Circuit used language that is apt here as well:

> A patentee may not arbitrarily select a point in a progressive change and maintain a patent monopoly for all operations in that progressive change falling [on] one side of that arbitrarily selected point. It is only where the selected point corresponds with the physical phenomenon and the patentee has discovered the point at which that physical phenomenon occurs that the maintenance of a patent monopoly is admissible.

Brown-Bridge Mills v. Eastern Fine Paper, Inc., 700 F.2d 759 (1st Cir. 1983) (*quoting Helene Curtis Industries v. Sales Affiliates*, 233 F.2d 148, 153 (2d Cir. 1956)).

statutory purpose of allowing those skilled in the art to predict with any certainty what will constitute infringement. Those claims are, therefore, invalid.

C. *Anticipation*

Gabriel asserts that the Knop patent had been anticipated for prior public use or sale by the AFC CH-10 horn reflector antenna and the Gabriel UHR10A and is, therefore, invalid under 35 U.S.C. § 102(b). Those antennas contained absorber to points about ten and four inches below the aperture, respectively. Under section 102 anticipation can be found only where the prior reference discloses each limitation of what is claimed. *In re Donahue*, 766 F.2d 531 (Fed. Cir. 1985). As the Court has previously stated, it cannot determine whether hybrid modes and the concomitant E and R_s exist in microwave horn antennas with absorber extending deep into the cone. Because of the same dispute the Court also cannot determine if they exist in the cited antennas, which have absorber only in the top of the cone. Gabriel again asserts that they are not present. Accordingly, anticipation is not shown for purposes of section 102b.

D. *Obviousness*

Under 35 U.S.C. § 103, a patent cannot be obtained, or if obtained is invalid under section 282, if the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. The inquiry which the Court is to undertake is whether that person, having all the teachings of the prior art before him would be able to produce the structure defined by the claim. *Orthopedic Equipment Co., Inc. v. United States*, 702 F.2d 1005, 1013 (Fed. Cir. 1983). This is not an inquiry to be based on hindsight using the patent in suit as a guide. *Id.* at 1012.

The Supreme Court has had the opportunity to discuss the statutory requirement of obviousness and has laid out a framework within which courts should assess the evidence:

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc. might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indices of obviousness or nonobviousness these inquiries may have relevancy.

Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966).

On the evidence before the Court, a person of ordinary skill in the field would be familiar with the problems in the antenna field and capable, either through educational training or experience or both, of solving them. Someone like Donald Allen, a Gabriel engineer with many years experience in the horn reflector industry, would fit the description. Although many of those working in the field possess higher educational levels than Allen, his practical experience qualifies him as one of ordinary skill. Similarly, Howard Hubbard, a vice president of AFC, with many years of experience in the horn reflector field, is one of ordinary skill in the field.

Both Allen and Hubbard testified that in the 1970s they had independently begun adding absorber in the cylinders of their horn reflector antennas in order to achieve better patterns. Given the progressive improvement, they said they extended

the absorber farther and farther into the cone. Despite the greatly improved RPEs, they stated that they did not adopt the design because they perceived that the gain loss sustained as a result of the absorber was too great for the needs of their customers. Mr. Hubbard, in fact, testified that he offered the antenna with absorber extended far into the cone to AT&T, which declined it because of the greater gain loss.

The Court is somewhat torn on this facet of the obviousness question. It is, of course, related to the question of invention discussed above, where the Court accepted Defendant's proofs demonstrating that the effect shown in the patent to be caused by the addition of absorber (the narrowing of the E-plane and taper of the field distribution) is a progressive one with no distinguishable line of demarcation along the continuum. Therefore, the testimony of Hubbard and Allen has a certain degree of intuitive credibility to a lay person. Specifically, once better patterns had been achieved through the addition of absorber in the cylinder and slightly into the cone, if better patterns were still required, it might have made sense to experiment by adding absorber further into the cone.

The Court is troubled, however, because there is no documentation or verification in the record of *any* of the tests which *either* Hubbard or Allen claims to have performed or of the claimed offer to AT&T. This fact undercuts the witnesses' credibility entirely in the Court's view. The companies for which these men worked were in the antenna business, and they knew of the importance of antennas with improved radiation patterns. If they had run tests, as they testified, the results achieved would have been valuable, even if the tested products were not immediately marketable, for they would have saved the company time and money in future design testing. It is, therefore, not credible that the test results and patterns, which in essence represent an investment of the com-

pany, would be treated so cavalierly that they would be lost without a trace. The Court, therefore, finds that Dan Allen and Howard Hubbard did not run tests in which they progressively increased the absorber in the cone to generate increasingly better RPEs in the E-plane. These alleged tests, then, did not constitute prior art which would have rendered the invention obvious.

The Court has examined all the other prior art references submitted by the parties at trial and will briefly discuss a few of the most pertinent. The Coleman patent and article, DX-3-2 and PX-8A, describing the corrugated horn antenna make clear the desirability of achieving substantially equal E- and H-planes. Although the corrugated horn employed absorber in the shield to mop up stray radiation, the inventors chose a highly cumbersome method of achieving the desired result. Thus, the easier, more economical method of merely adding absorber in the cone must not have been obvious to them.

Initially, the patent examiner thought that the combination of the Coleman horn and the Bui Hai U.S. patent would have made the patent in suit obvious, for the two references show a horn antenna and a structure with absorber surrounding the beam. Although the Bui Hai U.S. Patent, PX-8N, for a periscope antenna has absorber lining a cylinder surrounding the beam, the invention does not rely on the absorber to shape the beam, except for mopping up of stray radiation. Tr. at 228. The beam is shaped by a primary feed before it enters the absorber-lined cylinder. Of course, mopping up stray radiation is the beginning of the continuum shown by DX-39 as discussed above.

The Court thinks it is conceivable, however, that mopping up of stray radiation and shaping of the main beam by use of absorber are different concepts despite the fact that they can be physically demonstrated on the same continuum because they

are both manifested in the improved radiation patterns described in the patent. As Dr. Love stated:

> [T]he use of the absorber is now fundamentally different from the use of the blue absorber in the top region of the cone. The absorber here has a definite purpose, namely to create a boundary condition which is frequency independent, in substance supports the HE11, a physical phenomena [sic] totally different from the mopping up.

Tr. at 353.

It seems clear that the patent examiner also must have accepted a similar explanation because after having twice rejected the application on the basis of Bui Hai and Coleman patents, he approved the Knop patent on the basis of the final amendment. Thus, as Dr. Love suggested at trial, it would not have necessarily been obvious to extend the absorber because the effect sought was different from the mopping up previously known and unacceptable loss of gain was predicted and feared by all as a result of adding too much absorber. *See* Tr. at 354. Thus, any prior art, including the earlier Gabriel and AFC antennas, which demonstrates the use of absorber to perform a mopping up function would not make Plaintiff's invention obvious. This is true also of the Bui Hai European patent application '305, which discloses a lens antenna with absorber in a metal shell that serves as a shield. Although Gabriel argues that the absorber was meant to shape the beam, the Court finds persuasive Dr. Love's testimony to the effect that it is unlikely that someone of Bui Hai's stature in the field, who knew, as he did, the desirability of equal E- and H-planes, would have solved or attempted to solve the problem without adverting to it specifically. In fact, the absorber 7 is not even shown in

Figure 1, which demonstrates the operation of the antenna. The metal shell of the '305 is best described as a shroud or shield, the absorber lining of which will serve to mop up stray radiation. The invention disclosed in the Knop patent, then, would not have been any more obvious on the basis of the European '305 application than it was after disclosure of other antennas with absorber in their shields performing the mopping up function.

Finally, Gabriel argues that Professor Hamid's 1969 article, DX-70, which demonstrated the narrowing effect on the E-plane pattern of a dialectric lining in a cone, presaged the Knop invention because Andrew has posited that a lossy absorber can be analyzed mathematically as a pure dialectric. Professor Hamid's article is based on a previous article by him discussing the mathematics of a dialectric lined cone. As discussed above, the Court cannot resolve the high level mathematical dispute concerning whether it is proper to allow E and R_s to be real rather than complex numbers. The Court is, therefore not persuaded by the Hamid article of the obviousness of the Knop invention.

Determination of the Graham secondary factors also weighs more heavily in Andrew's favor than in Gabriel's. First, the testimony of Dr. Love, who the Court found very learned in the literature in this field over the past thirty years, established satisfactorily that there had existed a long-felt need for an antenna with substantially equal E- and H-planes and good gain that could operate in relatively wide band widths. Dr. Love also explained how many scientists had tried but failed to achieve an invention as successful in all respects as that described in the patent in suit. Tr. at 315-333 and *e.g.* PXs-8D, 8B, 7L, 7E, 8A. Also, the record supports the conclusion that the addition of absorber in the cone produced results that were unexpected by those in the field. As Dr. Love very credibly

testified, even if it had been suspected that adding absorber in the cone would give better patterns, he and others would not have undertaken it because of the expectation that there would be too much gain loss. Tr. at 341.

Despite the testimony of Daniel Allen, the Court thinks it unlikely that Gabriel knew how to make an antenna with the superior pattern generated by the embodiment of the Knop patent. It is clear that there was a market for such a product because of the increasingly congested routes to be traversed from one microwave horn antenna to the next; yet no one before Andrew had met the need. Moreover, Andrew was a relative newcomer to the field. If Gabriel had known how to produce such an antenna, it would certainly have done so because it knew of the problem caused by congestion as early as 1968. DX-10.1.

The Court is also left with the impression, although it would not find it as affirmative fact, that Gabriel probably copied the Andrew antenna when it designed its TH-10. This impression was created by a general fuzziness of the testimony of the Gabriel witnesses concerning how and when they had learned of and seen the Andrew SHX-10A. The AFC CH-10E also appears to be a clone of the successful Andrew product. These secondary factors, then, all militate in Andrew's favor on the issue of obviousness.

In examining commercial success, the final Graham test, the Court finds that Gabriel significantly undermined Andrew's assertion that it achieved great commercial success with the patented invention. Andrew had had general overall marketing success and it was unclear that the new antenna dramatically increased the improvement in what was a steadily improving market. Moreover, as Gabriel pointed out, a large part of any market increase may well have been due to sales to MCI, a company which needed and had been provided with high financial incentives for dealing with Andrew.

Although the prior art suggested the problem, the antennas described therein, singly or in combination, do not suggest that the patent in suit was obvious. Application of the Graham tests, which focus on practical considerations, does not suggest this conclusion either. On balance, then, the Court finds that Gabriel has failed to show by clear and convincing evidence, that the invention patented by Andrew was obvious.

IV. *Inequitable Conduct Before the PTO*

Section 1.56 of the Code of Federal Regulations imposes on patent applicants, their attorneys, and others associated with them who are involved in the prosecution of the patent an affirmative duty of candor and good faith. This consists more specifically of a duty on the part of those persons to disclose to the PTO all information of which they are aware which is material to the examination of the application. In determining whether information is material, the Court should not decide whether the information would invalidate the patent. Rather, it should determine whether there is a substantial likelihood that a reasonable examiner would consider it important in deciding whether to allow the application. *Argus Chemical Corp. v. Fiber Glass-Evercoat, Inc.*, 759 F.2d 10, 14 (Fed. Cir. 1985).

In addition to showing materiality by clear and convincing evidence, the party asserting inequitable conduct must prove a threshold intent.

> That intent need not be proven with direct evidence. . . . It may be proven by showing acts the natural consequences of which are presumably intended by the actor. . . . Proof of deliberate scheming is not needed; gross negligence is sufficient. . . .

> Gross negligence is present when the actor, judged as a reasonable person in his position, should have known of the materiality of the reference. . . . On the other hand, simple negligence, oversight, or an erroneous judgment made in good faith is insufficient.

J.P. Stevens & Co., Inc. v. Lex Tex LTD, Inc., 747 F.2d 1553 1560 (Fed. Cir. 1984).

Gabriel argues that both the AFC CH-10 antenna and the European patent application '305 were material prior art which Andrew or its attorneys should have disclosed to the patent office. As discussed above, the AFC CH-10 antenna contains absorber in the cylinder and approximately ten inches down into the cone below the bottom of the saddle. Although this antenna was not brought to the attention of the patent examiner, the patent application, and the patent itself, refer to the absorber 22 in the cylindrical shield which is used to absorb stray signals so they do not degrade the RPE. This absorber is clearly shown in Fig. 1 to extend into the top portion of the cone and is shown as distinct from the absorber 35, which in lining the portion of the cone below the end of absorber 22 for the purpose of shaping beams propagated from the source is said to constitute the invention. The application and patent specifically state that absorber 22 is "well known in the art." The Court finds that the AFC CH-10 would have been material to the patent examiner's inquiry. It clearly was of significance to the examiner to know that absorber had been placed down the cone to a certain degree.

The Court cannot find, however, the requisite threshold level of intent on the part of Andrew or the Knop patent inventions because the salient feature of the CH-10 was disclosed generically in the patent application. At trial, a dispute

arose concerning the function of the absorber in the top of the cone. Howard Hubbard, the AFC vice president, testified that the absorber in the top of the CH-10 cone served to shape the beam, Tr. at 643, while the patent application and amendment state that absorber of that type does not do so, but rather absorbs stray radiation. The patent application and amendment set forth the dichotomy between the two functions in such a way that the examiner could assess what Andrew was claiming about the function of its antenna compared with the function of antennas like the CH-10. Specific reference to the CH-10 embodiment would not have provided greater aid to the examiner in making his assessment. Although specific mention of the CH-10 would have been preferable, it was not grossly negligent for Andrew to refer generically to antennas with absorber in the top of the cone rather than specifically to the CH-10.

Gabriel also asserts that the European Patent Application '305 should have been disclosed. Andrew disclosed the '305 to the PTO, albeit after the Knop application had been granted on the basis of the amendment filed with the PTO on December 8, 1982. Notification of the '305 had been received at the office of Andrew's counsel on November 16, 1982, but was not submitted to the U.S. patent office until late December.

Although Gabriel asserts that Andrew dragged its feet by not submitting the newly discovered prior art until a time when would effectively not be considered, the record does not support this conclusion. The Court is satisfied that the filing of the supplemental prior art statement including the '305 was reasnoably timely. Moreover, the '305 reference probably is not material enough to warrant its presentation as prior art. As discussed above, the Court views the '305 application as seeking a patent for an antenna with absorber in a shield structure for the purpose of absorbing stray radiation. Although not

binding, the European patent office's determination that the '305 was not among the most relevant prior art is persuasive to this Court *See* Tr. at 1067. Because its absorber serves a mopping up function, it would not have added anything significant to the American examiner's consideration of the issue.

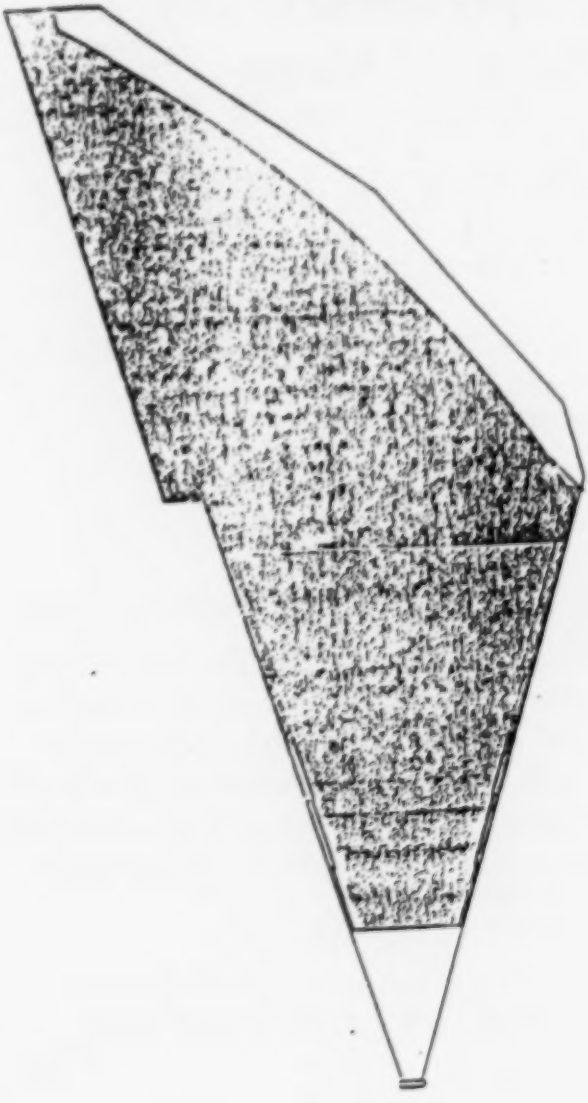
Accordingly, the Court finds that the Knop patent, U.S. Patent No. 4,410,892, is invalid for indefiniteness. It is *ORDERED* that judgment be entered for the Defendant, Gabriel Electronics, on Plaintiff's Complaint.

GENE CARTER
United States District Judge

Dated at Portland, Maine this 1st day of August, 1985.

Appendix 1

GABRIEL TH-10



PX 21

Appendix C.

United States District Court
District of Maine

ANDREW CORPORATION, Plaintiff	)	
v.	)	
	)	CIVIL NO. 83-0372 P
GABRIEL ELECTRONICS, INC., Defendant	)	

JUDGMENT

In accordance with the Opinion and Order of Carter, J. dated August 1, 1986, judgment is hereby entered for the defendant, Gabriel Electronics, Inc., against the plaintiff, Andrew Corporation, and the action as against said defendant is dismissed on the merits.

Dated this 4th day of August, 1986.

_____

Clerk, United States District Court

Appendix D.

Note: This Order has not been prepared for publication in a printed volume because it does not add significantly to the body of law and is not of widespread legal interest. It is a public record. It is not citable as precedent.

United States Court of Appeals for the Federal Circuit

86-1689/1690, 87-1193

ANDREW CORPORATION,
Plaintiff-Appellant,

v.

GABRIEL ELECTRONICS, INC.,
Defendant/Cross-Appellant.

Before FRIEDMAN, NEWMAN, and ARCHER, *Circuit Judges*.

ORDER

A petition for rehearing having been filed in this case, UPON CONSIDERATION THEREOF, it is ORDERED that the petition for rehearing be, and the same hereby is denied.

The suggestion for rehearing in banc is under consideration.

FOR THE COURT:

_____

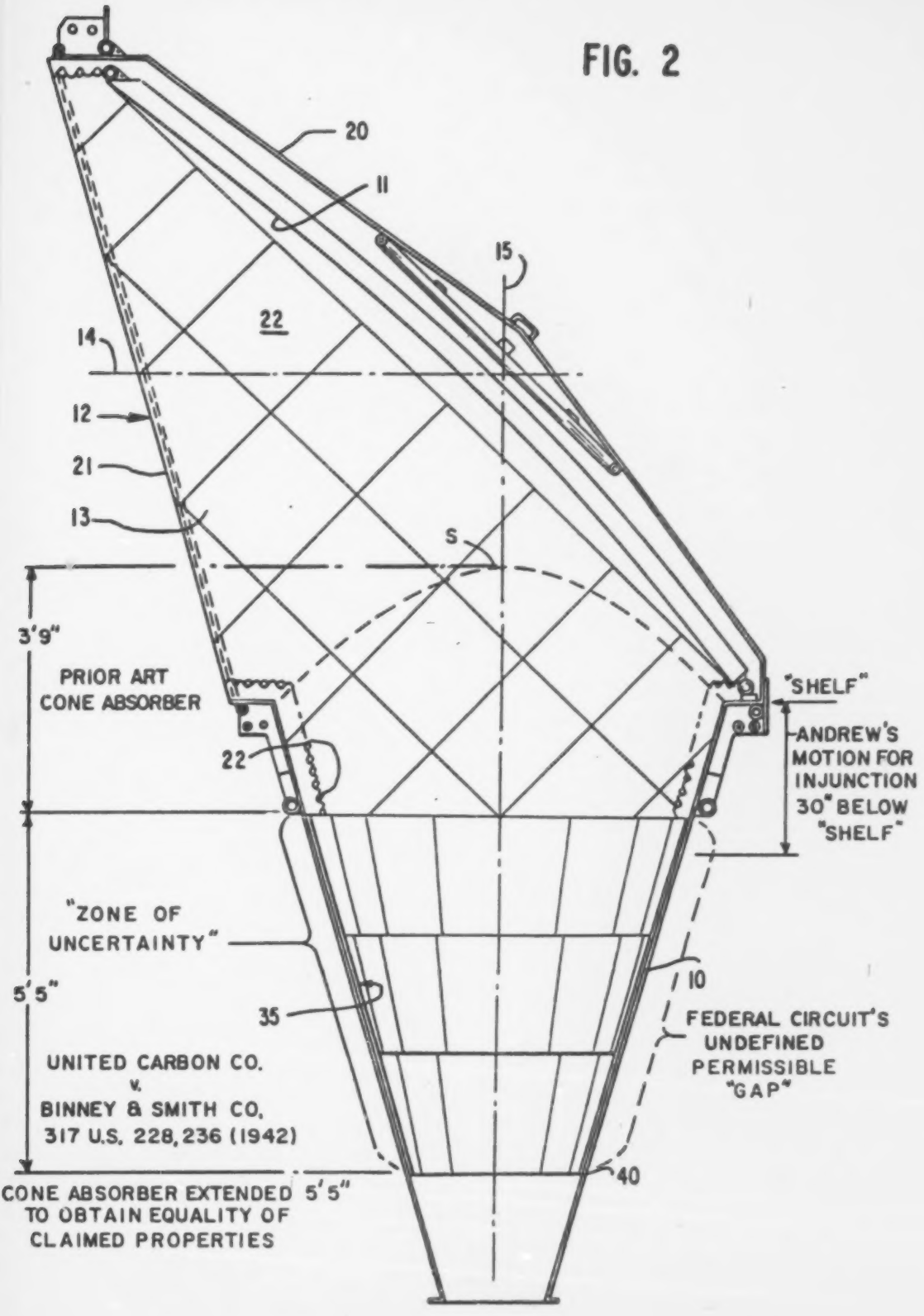
Francis X. Gindhart, Clerk

6/14/88

Date

cc: Mr. Stephen G. Rudisill
Mr. Charles Pfund

FIG. 2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S
3'9"
PRIOR ART
CONE ABSORBER
22
"SHELF"
ANDREW'S
MOTION FOR
INJUNCTION
30" BELOW
"SHELF"
"ZONE OF
UNCERTAINTY"
5'5"
35
10
FEDERAL CIRCUIT'S
UNDEFINED
PERMISSIBLE
"GAP"
UNITED CARBON CO.
v.
BINNEY & SMITH CO.
317 U.S. 228, 236 (1942)
40
CONE ABSORBER EXTENDED 5'5"
TO OBTAIN EQUALITY OF
CLAIMED PROPERTIES

(2)

Supreme Court, U.S.
FILED
OCT 11 1988
JOSEPH F. SPANIOL, JR.
CLERK

No. 88-432

IN THE

Supreme Court of the United States

OCTOBER TERM, 1988.

GABRIEL ELECTRONICS, INC.,

Petitioner,

v.

ANDREW CORPORATION,

Respondent.

ON PETITION FOR A WRIT OF CERTIORARI
TO THE UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

RESPONDENT'S BRIEF IN OPPOSITION

STEPHEN G. RUDISILL
Counsel of Record

ARNOLD, WHITE & DURKEE
321 N. Clark Street, #800
Chicago, Illinois 60610
(312) 744-0090
Counsel for Respondent

CHAS. P. YOUNG CHICAGO

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QUESTIONS PRESENTED

I. Did the Federal Circuit err in applying 35 U.S.C. § 112, second paragraph, to the particular facts of this case, using the well established legal principles which state that patent claims are not invalid for indefiniteness if the claim language clearly distinguishes what is claimed from what went before in the art, reasonably apprises those skilled in the art of the utilization and scope of the invention, and is as precise as the subject matter permits? *See, e.g., Eibel Process Co. v. Minnesota & Ontario Paper Co.,* 261 U.S. 45 (1923); *United Carbon Co. v. Binney & Smith Co.,* 317 U.S. 228 (1942).

II. Did the Federal Circuit violate the "clearly erroneous" standard of Federal Rule of Civil Procedure 52(a) by reversing the district court's decision on a question of law, and pointing out that the proper conclusion of law was supported by certain of the district court's own findings of fact on other issues, and certain evidence of record not considered by the district court?

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No. 88-432

IN THE

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OCTOBER TERM, 1988.

GABRIEL ELECTRONICS, INC.,

Petitioner,

v.

ANDREW CORPORATION,

Respondent.

ON PETITION FOR A WRIT OF CERTIORARI
TO THE UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

RESPONDENT'S BRIEF IN OPPOSITION

The Respondent Andrew Corporation[1] respectfully requests that this Court deny the petition for writ of certiorari, seeking review of the Federal Circuit's opinion in this case. That opinion is reported at 847 F.2d 819, 6 U.S.P.Q.2d 2010.

COUNTERSTATEMENT OF FACTS

The Knop patent at issue covers a valuable advance in the complex art of horn-reflector microwave antennas. The Knop

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[1] Pursuant to Rule 28.1 of the Supreme Court Rules, Respondent Andrew Corporation represents that it is a Delaware corporation having VSAT Systems, Inc., Antenas de Transmision S.A. de C.V. and SciCom Scientific Communications, Inc. GMBH as affiliates.

invention provides an antenna that produces radiation pattern envelopes (RPEs) that are very similar in two perpendicular planes, commonly referred to in the industry as the "E" and "H" planes. The district court found that in actual operation and testing of such antennas, "curves showing RPEs for horn antennas will never be identical." The claims of the Knop patent state that these RPE's "approach each other" (claims 1 and 5), are "close to" each other (claim 2), are "substantially equal" to each other (claim 3) or "closely approximate" each other (claim 6).

The district court held the claims of the Knop patent invalid only on the legal ground of indefiniteness under 35 U.S.C. § 112, second paragraph. The Federal Circuit reversed, concluding as a matter of law that the Knop patent claims defined the invention in words "as precise as the subject matter permits" and sufficient to "reasonably apprise those skilled in the art of the scope of the invention."

REASONS WHY THE PETITION SHOULD BE DENIED

1. Introduction

This case involves a routine dispute about the validity and infringement of certain patents. Neither question presented by petitioner meets the criteria of Rule 17, or in any other way warrants review by this Court.

Petitioner's first question, relating to the legal sufficiency of the description of Respondent's patent claims, does not even purport to discover a conflict between the Federal Circuit and any other Circuit court, which is not surprising given the Federal Circuit's exclusive appellate jurisdiction in this area. Nor does the Federal Circuit's decision break new ground that requires this Court's attention, or conflict with any applicable decisions of this Court with respect to patent claims.

Petitioner's second question erroneously suggests that the Federal Circuit ignored the "clearly erroneous" rule in its examination of the district court's ruling. This is simply inaccurate. The Federal Circuit carefully observed the distinction between findings of fact and conclusions of law, and reviewed the lower court's decision accordingly.

The total absence of any reason for this Court's review of the Federal Circuit's patent decision makes this case a singularly inappropriate candidate for the exercise of the Court's discretionary power.

2. **The Federal Circuit correctly applied statutory and decisional standards governing the use of terms of degree in patent claims.**

No one disputes the fact that 35 U.S.C. § 112, second paragraph, requires patent specifications to conclude "with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." The Federal Circuit carefully evaluated the facts found by the trial court about the technological field covered by the Knop patent and concluded, as a matter of law, that the patent satisfied the statutory standard.

It is well settled that invalidity under 35 U.S.C. § 112, second paragraph, is a question of law. *See, e.g., Graham* v. *John Deere Co.*, 383 U.S. 1, 17-18 (1966); *Specialty Composites* v. *Cabot Corp.*, 845 F.2d 613, 6 U.S.P.Q.2d 1601, 1604 (Fed. Cir. 1988) ("Claim interpretation is a matter of law.").

Petitioner contends in effect that the use of *any* term of degree in a patent claim renders the patent invalid. This extreme contention directly contradicts well established legal principles developed by this Court in decisions dating back more than 50 years, and in numerous decisions by various Circuit courts following the decisions of this Court. In addition, a number of decisions by this Court have

expressly approved patent claims using terms of degree, as will be pointed out in detail below.

The decisions of this Court that developed the legal principles adhered to by the regional Circuit courts, and more recently by the Federal Circuit, include the *United Carbon*[2] case cited by petitioner. *United Carbon*, however, is just one of the line of Supreme Court cases that developed the principles now followed by the lower courts when evaluating the validity of patent claims attacked on the ground of "indefiniteness." Other cases in that line include *Minerals Separation, Ltd.* v. *Hyde*, 242 U.S. 261 (1916); *Eibel Process Co.* v. *Minnesota & Ontario Paper Co.*, 261 U.S. 45 (1923); *Smith* v. *Snow*, 294 U.S. 1, (1934); *General Electric Co.* v. *Wabash Corp.*, 304 U.S. 364 (1938); and *Standard Brands* v. *Yeast Corp.*, 308 U.S. 34 (1939).

Contrary to petitioner's arguments that the Federal Circuit decision here "ignored" *United Carbon*, the Federal Circuit decision is in complete accord with *United Carbon* and the entire line of cases cited above. The Federal Circuit opinion here applied the legal principles it quoted from *Georgia-Pacific Corp.* v. *United States Plywood Corp.*, 258 F.2d 124, 136, 118 U.S.P.Q. 122, 132 (2d. Cir.) *cert. denied*, 358 U.S. 884 (1958):

> If the claims, read in the light of the specification, reasonably apprise those skilled in the art both of the utilization and scope of the invention, and if the language is as precise as the subject matter permits, the courts can demand no more.

The *Georgia-Pacific* case in turn cited *United Carbon*, so it is disingenuous for petitioner to urge that this statement of the law "ignores" *United Carbon*. In addition to *United Carbon*, *Georgia-Pacific* cited two Court of Appeals decisions as direct precedent for the rule of law articulated in the above quotation. Those two decisions were *Lever Bros. Co.* v.

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[2] *United Carbon Co.* v. *Binney & Smith Co.*, 317 U.S. 228 (1942)

Procter & Gamble Mfg. Co., 139 F.2d 633, 639 (4th Cir. 1943), and *H.H. Robertson Co.* v. *Klauer Mfg. Co.*, 98 F.2d 150, 153 (8th Cir. 1938).

The *Lever Bros.* court also cited *United Carbon*, along with most of the other Supreme Court cases cited above, as establishing the same legal principles articulated in *Georgia Pacific*. The *H.H. Robertson* court cited the Supreme Court's decision in *General Electric, supra*. Thus, there is an abundance of Supreme Court precedent directly underlying the precise statement of law followed by the Federal Circuit here and quoted from *Georgia-Pacific*.

The differences in the results reached in various cases arise solely from the differences in the facts involved in the respective cases, not from any differences in the law applied. The law has remained remarkably consistent in this area, and the effect of the Federal Circuit decision here is to maintain that consistency.

The specific criteria applied by this Court and the various Circuit courts in all the above cases were the same as those applied by the Federal Circuit in the present case. Those criteria included consideration of whether the claim language clearly distinguishes what is claimed from what went before in the art, whether that language reasonably apprises those skilled in the art of the scope of the invention, and whether the claim language is as precise as the subject matter permits.

The district court in the present case erred in failing to apply the above criteria to certain highly relevant facts, including findings of fact that the district court itself made in its analysis of other issues in the case. For example, the Federal Circuit opinion points out that:

> [I]ndeed the [district] court found that it "became very clear during trial . . . that curves showing RPEs for horn antennas will never be identical." Words similar to those used in the Knop claims appear in prior art

> patents that were of record in the district court, dealing with similar technology.

As mentioned above, this Court has expressly approved patent claims using terms of degree. For example in *Eibel Process, supra,* this Court approved the use of the terms of degree "substantial" and "high" on the basis of evidence that persons skilled in the art would understand the terms in question:

> This patent and its specifications were manifested to readers who were skilled in the art of paper making and versed in the use of the Fourdrinier machine. . . . Expressions quite as indefinite as "high" and "substantial" in describing an invention or discovery in patent specifications and claims have been recognized by this Court as sufficient. [citations omitted]

261 U.S. at 65-66.

More recently, in *Diamond* v. *Diehr*, 450 U.S. 175 (1981), this Court analyzed and approved patent claims which defined a method of operating a rubber-molding press, using terms such as "at a location *closely adjacent* to the mold cavity," performing calculations "at *frequent* intervals," heating the mold to "a temperature range *approximating* a predetermined rubber curing temperature," and opening the press when a comparison of two time periods "indicates *equivalence*." The Federal Circuit has also repeatedly approved patent claims using such terminology. As stated in the Federal Circuit's opinion in the present case, such terms "are ubiquitous in patent claims."

It is interesting that petitioner would contend that the Federal Circuit's decision in the present case is contrary to the Federal Circuit's decision in *Seattle Box*[3] when the Court of Appeals' opinion in the present case actually cites and quotes from *Seattle Box*. In fact, the specific language

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[3] *Seattle Box Co., Inc.*, v. *Industrial Crating and Packaging, Inc.*, 731 F.2d 818 (Fed. Cir. 1984).

quoted from *Seattle Box* in the Federal Circuit's opinion in the present case makes the precise point that petitioner says the panel ignored, i.e., that the acceptability of a term of degree depends on "whether one of ordinary skill in the art would understand what is claimed . . . in light of the specification."

Thus, the Federal Circuit's decision here does not represent any departure from either its own precedent or that of this Court.

3. The Federal Circuit correctly reviewed the district court's conclusions of law, and gave due deference to its findings of fact.

In arguing that the Federal Circuit allegedly "ignored" the clearly erroneous standard of Federal Rule of Civil Procedure 52(a), petitioner repeatedly mischaracterizes conclusions of law as findings of fact. Its claim that the court of appeals failed to follow the per curiam ruling in *Dennison Manufacturing Co.* v. *Panduit Corp.*, 475 U.S. 809 (1986), is all the more surprising in light of the court's explicit reliance on the clearly erroneous standard where it was properly applicable. (See, e.g., pet. app. at 10a, concluding that the district court's findings concerning inequitable conduct had not been "shown to be clearly erroneous"; at 4a, affirming the decision of infringement of the Knop patent because "no clear error" was shown; and at 15a, affirming the decision of noninfringement of the Dawson patent because "we discern no clear error in the court's analysis.")

The question throughout the proceeding had to do with the legal sufficiency of the claims. It was the trial court's application of law to fact, and its decisions on which facts were pertinent and which were not, that the appellate court was reviewing. Nothing in *Dennison* or any other decision of this Court required it to defer to the district court on these matters. To the contrary, in *Graham* v. *John Deere Co., supra,* this Court characterized the "ultimate question" of patent validity as one of law. In *Bose Corp.* v. *Consumers*

Union of U.S., Inc., 466 U.S. 485, 501 (1984), this Court reaffirmed that Rule 52(a)

> does not inhibit an appellate court's power to correct errors of law, including those that may infect a so-called mixed finding of law and fact, or a finding of fact that is predicated on a misunderstanding of the governing rule of law.

See also *Anderson* v. *City of Bessemer City, N.C.*, 470 U.S. 564 (1985); *Pullman-Standard* v. *Swint*, 456 U.S. 273 (1982); *Amadeo* v. *Zant*, 108 S.Ct. 1771 (1988).

Thus petitioner is incorrect when it characterizes the district court's conclusion regarding the language in the Knop claims as a "finding of fact." It was plainly a conclusion of law that the Federal Circuit reviewed, and the factual basis for the reversal of the district court's conclusion is specifically pointed out in the Federal Circuit opinion.

CONCLUSION

For the foregoing reasons, the petition for a writ of certiorari should be denied.

Respectfully submitted,

STEPHEN G. RUDISILL
ARNOLD, WHITE & DURKEE
321 N. Clark Street, #800
Chicago, Illinois 60610
(312) 744-0090

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In the
Supreme Court of the United States

OCTOBER TERM, 1988

GABRIEL ELECTRONICS, INC.,
PETITIONER,

v.

ANDREW CORPORATION,
RESPONDENT.

ON PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

Petitioner's Reply to Respondent's Brief in Opposition

CHARLES E. PFUND*
ROBERT M. ASHER
DIKE, BRONSTEIN, ROBERTS,
CUSHMAN & PFUND
130 Water Street
Boston, Massachusetts 02109
(617) 523-3400
Counsel for Petitioner

*Counsel of Record

BATEMAN & SLADE, INC. BOSTON, MASSACHUSETTS

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Respondent's Cited Cases Which Cite *United Carbon* Do Not Support the Federal Circuit's Decision.

The Federal Circuit's departure from the law of this Court as set forth in the *United Carbon Co.* v. *Binney & Smith Co.*, 317 U.S. 228 (1942) is not justified by the cases cited in respondent's opposition.

The present case involves the use of words of degree as the distinguishing patentable feature in patent claims where the improvement begins with advances made in the prior art. The difficulty with the claims of the Knop patent, as found by the district court, is that there is no way of knowing how far down the cone of a horn reflector antenna one may extend absorber without coming within the scope of the patent claims. In the present case, as progressive additions of absorber are made a progressive increase in the taper of the field distribution in the E plane results. This phenomena of an increased taper thus appeared in the prior art and cannot be effectively used to distinguish the invention absent a defined starting point. The Federal Circuit found definiteness at the end point — equality — of E and H plane properties. It did not even consider the starting point in the gap between "equality" and the prior art which the district court said was arbitrary and unforeseeable and as to which the claims gave no clue as to what is intended (App. B, 33a).

Respondent's brief is totally devoid of discussion of the above issue and the cases cited are not in point. This case thus differs significantly from those cases in which words of degree are used in a patent claim to define an element which achieves a function that was not present in the prior art. In such cases, those skilled in the art would be capable of determining those apparatus or methods which come within the scope of the claims, since it would only be those apparatus or methods which achieve the desired functions of the patent. In the present case, the phenomena sought to be achieved by the patent existed, although to a lesser extent, in antennas that were available in the prior art. Hence, function cannot be used to determine the scope of the patent claims. Since the words of degree used in the Knop patent claims fall on a continuum there exists a zone of uncertainty between the prior art and the claimed invention. Such a zone having been strictly forbid-

den by this Court's decision in *United Carbon*, the Federal Circuit's departure from that case law should be reviewed by this Court.

Petitioner strenuously objects to the spurious argument introduced by respondent at page 6 of its Brief in Opposition in an attempt to show that this Court has recently approved words of degree in patent claims, *Diamond* v. *Diehr*, 450 U.S. 175 (1981). In that case this Court was not faced with any Section 112 indefiniteness issue. The only issue discussed in that case was statutory subject matter patentability under 35 U.S.C. § 101. The case has absolutely no relation to the issues of the present case and cannot be useful in harmonizing the Federal Circuit's unprecedented decision in this case with the precedents of this Court.

Facts Crucial to the Indefiniteness Issue Were Set Aside Without Application of the Clearly Erroneous Standard.

Respondent's brief lists a number of issues in which the Federal Circuit referred to the Rule 52(a) clearly erroneous standard as to issues in which it was *affirming* the district court. Notoriously missing from the respondent's list and the Federal Circuit's reference to Rule 52(a) is the one issue, indefiniteness of the claims, where the protections of Rule 52(a) are required. The Federal Circuit failed to heed the requirements of the Rule.

Rule 52(a) requires an appeals court to give deference to the factual findings of the trial court. In order to prevent an appeals court from substituting its own view of the facts, Rule 52(a) requires that fact findings not be set aside unless clearly erroneous. The Federal Circuit was oblivious to this requirement in ruling on indefiniteness under Section 112. Here the

Federal Circuit reversed the trial court holding with respect to indefiniteness without mention or application of the clearly erroneous standard. Rather, the Federal Circuit wrongfully substituted its own view of the facts and approved the zone of uncertainty (i.e., the "gap" App. A., 9a) forbidden by this Court.

Respondent's brief highlighted the importance of factual findings in making a determination of indefiniteness of the claims. As respondent pointed out at page 5 of its brief,

> The differences in the results reached in various cases arise solely from the differences in the facts involved in the respective cases, not from any differences in the law applied.

It is thus clear to both parties that the factual findings underlying a decision of indefiniteness are critical to the final decision. The Federal Circuit's failure to make application of the clearly erroneous standard to the factual findings underlying indefiniteness was critical to its decision in reversing the trial court. This was a clear violation of this Court's mandate in *Dennison Manufacturing Co.* v. *Panduit Corp.*, 475 U.S. 809 (1986) warranting review by this Court.

A writ of certiorari should issue to bring the procedure and decisions of the United States Court of Appeals for the Federal Circuit into compliance with the precedents of this Court.

Respectfully submitted,

CHARLES E. PFUND,*
ROBERT M. ASHER,
DIKE, BRONSTEIN, ROBERTS,
CUSHMAN & PFUND,
130 Water Street,
Boston, Massachusetts 02109.
(617) 523-3400
Counsel for Petitioner

*Counsel of Record